



AMSR-E Sea Ice Product Validation: Field Observations and Modeling Components

Coordinated P-3 flights and in-situ measurements (Barrow, AK area. Pilot effort - April 2002; Full campaign - Feb. - March 2003)

- snow depth and properties on sea ice
- sea ice and snowpack temperature
- ice type, thickness, roughness and microphysical properties

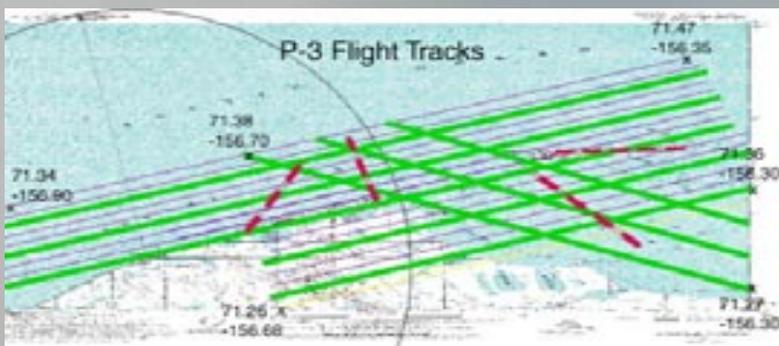
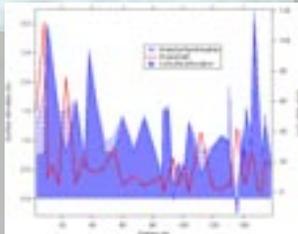
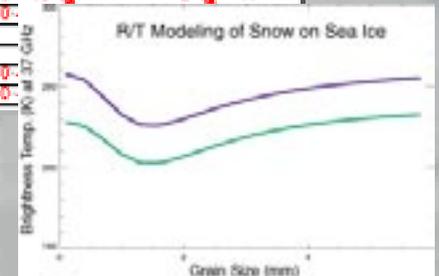


Table 3 - Surface and atmospheric parameters for the sensitivity tests.

Parameter	Range	Interval
Surface		
Snow density	700 - 950 kg/m ³	10 kg/m ³
Salinity	0 - 18 ‰	0.5 ‰
Grain size	0 - 10 μm	0.5 μm
Thickness (PY)	0.2 - 2 m	10 cm
Thickness (MT)	1 - 5 m	10 cm
Slope angle	0 - 90°	3°
Snow density	250 - 500 kg/m ³	15 kg/m ³
Snow grain size	0 - 5 μm	0.5 μm
Snow depth (PY)	0 - 70 cm	1 cm
Snow depth (MT)	0 - 70 cm	1 cm
Free water content (PY)	0 - 40 %	2 %
Free water content (MT)	0 -	
Atmosphere		
Liquid water path (LWP)	0 -	
Assessable water	0 -	



Modeling of the snow-ice-atmosphere column

- algorithm sensitivities and error under a range of conditions;
- validation via forward modeling.



ARCTIC2003 EOS AquaAMSR-E Sea Ice Validation Aircraft Campaign

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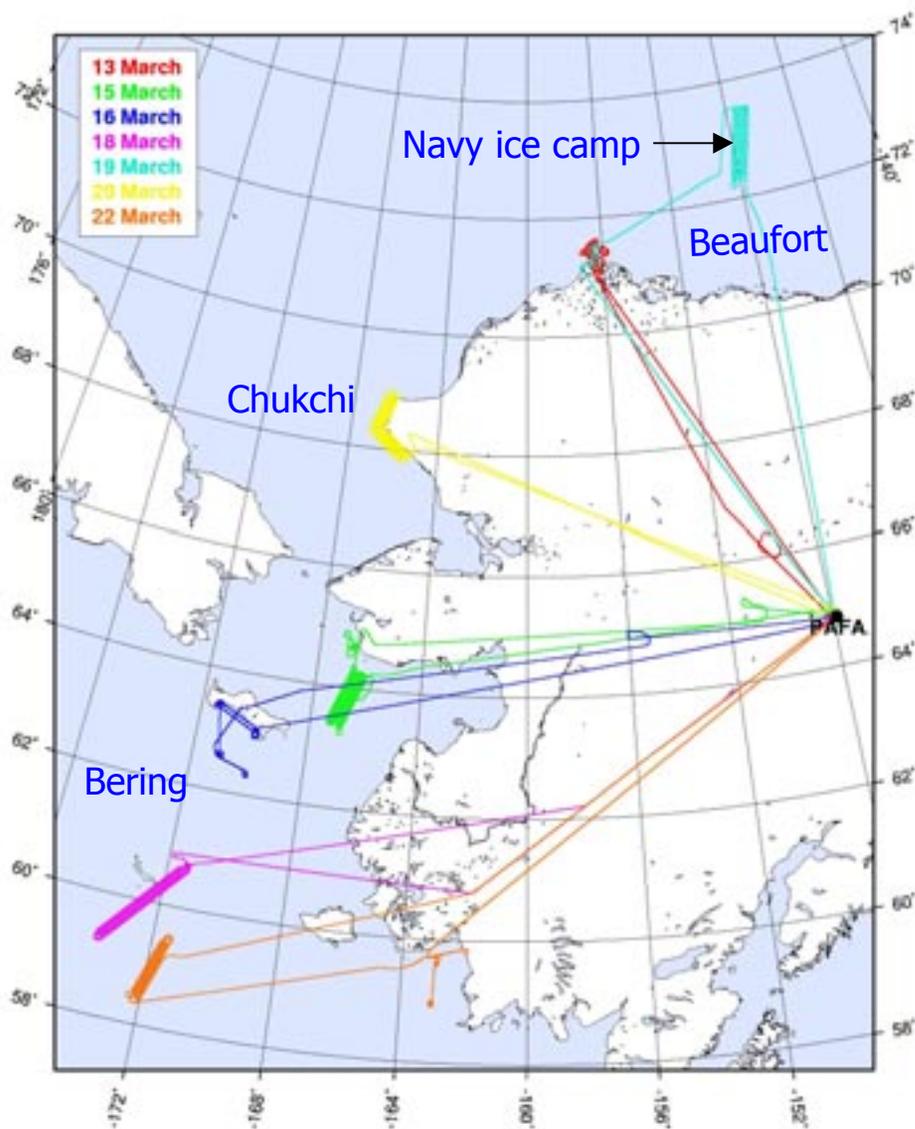
- ❖ **Successfully completed seven aircraft flights with the NASA P-3 to validate the AMSR-E standard sea ice products:**
 - Sea ice concentration
 - Sea ice temperature
 - Snow depth on sea ice

- ❖ **Arctic regions covered included the Bering, Beaufort, and Chukchi seas**

- ❖ **P-3 flights were coordinated with:**
 - Surface measurements at Barrow, AK and at a Beaufort Sea ice camp
 - Satellite overpasses including: AMSR-E, Landsat 7, MODIS, RADARSAT, and ICESat

- ❖ **P-3 instrumentation included:**
 - NOAA ETL Polarimetric Scanning Radiometers (PSR-A and PSR-CX)
 - NASA Wallops Airborne Topographic Mapper (ATM)
 - NASA Langley Turbulent Air Motion Measurement System (TAMMS)
 - NASA Wallops and NOAA ETL digital & video cameras; IR radiometers

2003 Alaska Sea Ice Validation Missions



- March 13, 2003; Barrow (Elson Lagoon):** Low altitude flights (500ft) coincident with in-situ surface measurements of snow and ice physical properties (collaboration w/ M. Sturm & J. Maslanik)
- March 15, 2003; Norton Sound/Bering Sea:** Maps of a divergent ice cover at 4300 ft coincident with Landsat 7 coverage; a/c stacks over coastal polynya at different altitudes to measure heat and moisture fluxes (collaboration w/ B. Walter)
- March 16, 2003; St. Lawrence Island polynya:** stacks over polynya at different altitudes to measure heat and moisture fluxes (collaboration w/ B. Walter); coincident Landsat 7 and ICESat coverage
- March 18, 2003; Ice edge near St. Matthew Island:** Mapping of ice edge at 4300 ft; coincident Radarsat Coverage
- March 19, 2003; Beaufort Sea ice camp, Barrow:** Mapping of area at 4300 ft, mostly multiyear ice; coincident ICESat coverage; 2nd Barrow survey
- March 20, 2003; Point Hope/Kotzebue Sd.:** Mapping of area at 4300 ft; various sea ice types; co-incident Landsat 7 and Radarsat coverage
- March 22, 2003; Ice edge and Kuskokwim Bay:** Mapping of ice edge (coincident Landsat 7 coverage) and a/c stacks over polynya in Kuskokwim Bay to measure heat and moisture fluxes